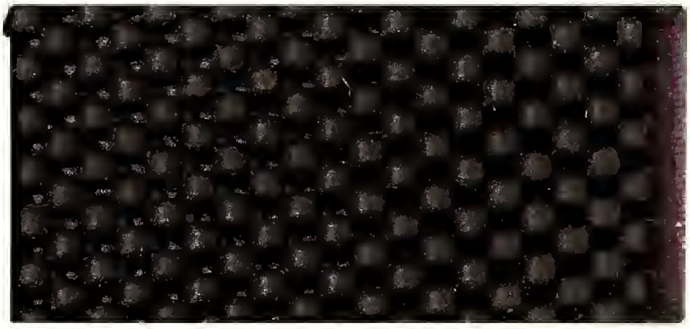
3075-2 May 1982

Final Research Plan for Alternative Methods for Developing a Relative Value Scale of Physicians' Fees

Jack Hadley, Philip Held,
John Holahan and Judith Wagner

THE URBAN INSTITUTE
2100 M Street, N.W.
Washington, D.C. 20037

Project Report



3075-2 May 1982

Final Research Plan for Alternative Methods for Developing a Relative Value Scale of Physicians' Fees

Jack Hadley, Philip Held,
John Holahan and Judith Wagner

The research for this report was supported by Contract No. HCFA-500-81-0053 from ORDS/HCFA/DHHS. Opinions expressed are those of the authors and do not necessarily represent the views of The Urban Institute or its sponsors.

THE URBAN INSTITUTE
2100 M Street, N.W., Washington, D. C. 20037

I. INTRODUCTION

The basic goal of this project is to describe, evaluate, and compare alternative methods of constructing relative value scales. Because the primary focus is on methods, we will use only a relatively small number of procedures in the study, about 125 out of the approximately 5,000 procedures listed in CPT-4. The study's procedure list will consist of the 100 high volume Medicare procedures reported in Medicare's prevailing charge directories, some high volume Medicaid procedures typically not provided to Medicare beneficiaries (primarily pediatric, obstetrical, and gynecological services), and selected problem procedures, e.g., new procedures, procedures characterized by rapid technical change, and procedures thought to be either over- or underused.

Alternative combinations of methods and data bases will be used to assign relative values to the test procedure list. In each case there will be a single scale covering all physicians. The alternative scales will be compared in two ways. One is for the degree of conformity across scales, based on simple statistical measures such as rank-order correlation, mean and median values on the scale, and values at various percentiles. The second set of comparisons will be in terms of the cost implications for HCFA and distributional implications for different groups of physicians.

This report updates the Preliminary Research Plan (U.I. Project Report No. 3075-1) submitted in November 1981. It provides greater detail on the specific data bases, computational methods, and implementation procedures which will be used to construct the alternative RVSs. The next section identifies the procedures which will be used in assigning relative values under different methods. The third section describes our plans for actually assigning relative values. Each of the six major classes of approaches is discussed

in turn. The fourth section describes the statistical methods which will be used to assess how similar the alternative RVSs are. The final section outlines our plans for simulating the cost and distributional implications of each RVS.

II. SELECTION OF PROCEDURE CODES

Procedure codes to be used in the study were selected on the basis of a number of criteria. The initial criterion was frequency of performance. The 100 most frequently performed Part B Medicare procedures will provide a large sample size for comparison between alternative RVS's and will represent a substantial portion of Medicare Part B expenditures. This list will include the 18 visit codes - office, hospital, nursing home, and home which are estimated to account for more than 70 percent of total physician payments by Medicare. (See Table 1). The 29 procedures listed in Table 1 account for more than 85 percent of all Medicare payments to physicians. Table 2 shows similar data for 12 frequent surgical procedures.

Many diagnostic and therapeutic procedures are not done with great frequency but, because the price for performance is so high, they represent a significant level of expenditure. A number of procedures, then, are selected because their unit price is quite high and the frequency of their performance is increasing. Examples include diagnostic endoscopy (colonoscopy, gastroscopy), hip arthroplasty, lens extraction, and pacemaker insertion.

Examining new, frequently performed, technologies permits an especially good testing ground for the cost-based and consensus methods of constructing RVSs. New, technically complex procedures generally have an initially high unit cost because of the necessary "learning curve" of the provider and the relatively low volume of performance. Over time, the procedure can be performed more efficiently. Good examples include the class of gastrointestinal endoscopies and ultrasonography, including echocardiography. The Urban Institute's California Medicare/Medicaid Physician Claims File provides claims data for a period of five years 1974-1978. The above new technologies became much more widely disseminated during that period and will, therefore, allow a test of stability over time of a charge-based RVS.

Table 1

Twenty-Nine Frequent Medicare Procedures, California, 1978 [a/]

Description	1969 CRVS Procedure Code	Frequency Per Quarter	Rank by Freq.	Prevailing Charge[b/]	Expenditures (000's)	Total Expen. (%)	Rank by Expen.
O.V.-limited, est.	90050	141,083	1	$ 16.13	$ 2,275.7	15.63	2
H.V.-follow-up/limited	90250	127,477	2	21.11	2,691.0	18.48	1
O.V.-brief, est.	90040	73,011	3	16.13	1,130.9	7.77	5
O.V.-inter., est.	90060	68,616	4	19.79	1,357.9	9.33	3
H.V.-follow-up/limited	90260	33,238	5	21.21	705.0	4.84	6
H.V.-follow-up/brief	90240	30,015	6	18.44	553.5	3.80	9
Urinanalysis	81000	25,617	7	5.66*	145.0	1.00	18
Electrocardiogram	93000	21,054	8	27.73	583.8	4.01	7
Chest X-Ray: Two Views	71020	20,243	9	28.30	572.9	3.93	8
O.V.-extended, est.	90070	13,126	10	23.58	309.5	2.12	15
Nursing home visit-limited	90453	11,314	11	28.40[c]	321.3	2.21	14
H.V.-comprehensive	90220	10,645	12	107.56[c]	1,145.0	7.86	4
Complete Blood Count	85010	10,477	13	9.43*	98.8	.68	20
Nursing home visit-brief	90443	10,344	14	19.83	205.1	1.41	16
O.V.-comprehensive, est.	90080	9,980	15	51.76	516.6	3.53	10
Blood Sugar	84330	7,055	16	7.55[d]	53.3	.37	25
Psychotherapy	90800	6,062	17	53.77[d]	326.0	2.24	13
H.V.-follow-up/extended	90270	5,731	18	33.02[d]	189.2	1.30	17
H.V.-inter.	90215	5,069	19	76.83[c]	389.5	2.67	12
Consultation-comp.	90620	4,947	20	80.75[d]	399.5	2.74	11
Therapeutic Inj.	90705	4,812	21	2.83[c]	13.6	0.09	29
O.V.-minimal, est.	90030	4,050	22	9.30	37.7	0.26	27
Tonometry	92100	3,911	23	13.49[d]	52.8	0.36	26
O.V.-brief-new	90000	3,706	24	23.58[d]	87.4	0.60	23
Hematology-Sedimentation	85650	3,475	25	5.66[d]	19.7	0.14	28
Arthrocentesis	20610	3,471	26	26.89[d]	93.3	0.64	21
Ophthalmology-new	92000	3,270	27	33.02[d]	108.0	0.74	19
O.V.-limited-new	90010	3,233	28	26.89	86.9	0.60	24
Home visit-limited/est.	90150	3,196	29	28.30	90.4	0.62	22
					$14,559.2		

* Based on specialist only.

[a/] Data are from The Urban Institute's Physician Medicare Claims File. This file is a longitudinal sample of approximately 7,000 physicians in solo or single specialty practice. The 25th most frequent procedure was chemotherapy (Code 96030) with a count of 3,695. This procedure was dropped because a prevailing charge could not readily be obtained.

[b/] Prevailing charge was estimated by taking the weighted mean of the general practice and specialty charge with weights of 0.3 and 0.7 respectively. The prevailing charges were those for Orange County and were obtained from the Directory of Medicare's Prevailing Charges, 1978, Health Care Financing Administration, Wash., D.C.

[c/] Prevailing was estimated using the CRVS value and the prevailing charge of a similar procedure.

[d/] General Practice prevailing not available. Specialist charge only.

Distribution of Twelve Most Frequent "Surgical" Procedures for Medicare, 1978, from a Sample of California Physicians[a/]

Description	1969 CRVS Code	Frequency	Prevailing[b] Fee	Expenditures	Percent	Cumulative %	Rank by Exp.
Arthrocentesis	20610	3471	$ 27.14	$ 94,203	6.12	88.97	4
Proctosigmoidoscopy	45300	2264	34.47	78,040	5.07	94.04	5
Injection-Ligaments, Tendons	20550	1001	20.36	20,380	1.33	96.87	7
Eye Surgery-Lens Excision	66900	883	907.83	801,614	52.12	52.12	1
Electro-Surgical Destruction	17000/ 17001	856	26.95	23,069	1.50	95.54	6
Strapping for Fracture	29580	366	20.36	7,452	0.48	99.64	11
Herniorrhaphy	49505	317	488.52	154,861	10.07	82.85	3
Endoscopy/Otoscopy	69200	270	20.00	5,400	0.35	99.99	12
Skin Biopsy	11100	268	45.00	12,060	0.78	98.50	9
Fracture-Internal Fixation	27236	254	1,251.15	317,792	20.66	72.78	2
Thoracentesis	32000	227	45.00	10,215	0.66	99.16	10
Excision-Benign Lesion	11440	217	60.00	13,020	0.85	97.72	8
Total				$1,538,106			
(Total of All "Surgical" Procedures)				$3,726,675			

a/ See previous table on source of data. "Surgery" as defined by 1969 CRVS.

b/ Prevailing data are from the source cited in previous table, except the fee chosen was for the the specialist who was most likely to perform such surgery.

A few procedures with rapidly changing technologies, particularly in laboratory and radiology procedures, will also be examined. Frequently, the changing technology is cost reducing. Or, increasing volume of performance often justifies acquisition of a technology that results in lower production costs. As a test changes from being performed rarely as a "special" test to frequently as a "routine" test, there should be a resultant decrease in unit costs. The comparison of RVSs will look at some of these tests to see if the relative value is adjusted to keep pace with the technical advances and increased volume. Examples include the autoanalyzer profiles (SMAC), hepatitis B surface antigen, digitalis serum level, and T_4 by radioimmune assay.

Another class of procedures are those that involve considerable physician discretion. To produce similar diagnostic information on therapeutic outcomes, physicians often have alternative procedures at their disposal. Yet the alternative procedures can carry quite different charges and result in different system costs. For example, certain surgical procedures can be performed either in a hospital or an outpatient setting. Alternative diagnostic studies, such as colonoscopy or barium enema, provide arguably similar information to the physician but with quite different charges. Including a few alternative procedures where the ordering physician has considerable discretion should provide useful tests of the consensus and social preference methods of constructing RVSs.

Finally, there are procedures whose current fees exhibit high coefficients of variation. Some are new technologies in the process of dissemination. But others are long-standing procedures. A comparison across RVSs will help examine why current fees vary so widely and whether the variation is reasonable.

Table 3 presents a tentative list of procedures which meet at least one of these criteria. (There is some overlap between this list and the 100 most frequent Medicare procedures.) Table 4 lists procedures that can be identified on the USC-Mendenhall data file, which reports the time physicians spend with patients. These procedures are of particular interest because they will permit a direct, though tentative comparison of time-based and charge-based methodologies. This is discussed in more detail in section IIIB, below.

Table 3

Sample Additional Procedures for Testing
Alternative RVS Construction Methods[1]

	High Expenditures for Medicare/or Medicaid	CRVS Code
	Diagnostic	
	Cystometroscopy	5200,52100,52105
	Esophagoscopy, Gastroscopy	43200,43700
*	Proctosigmoidoscopy (B_x)	45300,45305
*	Thoracentesis	3200
	Echocardiogram	76610
	Cardiac catheterization	93501 - 93528
*	Arthrocentesis	20600, 5, 10
	Colonoscopy	40200 ---
	Therapeutic	
	Injection of Tendon/Ligament	20550
	Arthroplasty Hip - cup	27126
	- total hip prosthesis	27130
	Transurethral resection	52600
	Suprapubic prostatectomy	55820
*	Partial Colectomy	44140
*	Cholecystectomy	47600
*	Inguinal Herniorrhaphy	49505
	Total Hysterectomy	58150
	Vaginal Hysterectomy	58620
	Lens Extraction	66900
	Electro-Surg. Destruction	17000
	Excision - benign lesion	11460
	Debridement of skin	11000
	Breast Excision of cyst	19120
*	Mastectomy	19180, 19240
	Skin biopsy	11100
	Pacemaker - permanent - insertion	33200, 01
*	Appendectomy	44950
*	I & D	10000 ---
	New Frequently Performed Procedures	
	Endoscopies (above)	
	Echocardiography (above)	
	Hip Replacement (above)	
	Mammography	76901
	Pelvic sonogram	76850
	Pulmonary perfusion scan	78580
	Lab Any 7-12 tests, 12 tests, 13-16 tests, etc.	80012, 80112, 80116,

Table 3 (Cont.)

New Lab Tests Gained General Acceptance in Mid 70s

Digoxin	82643
T_4 (RIA)	83537
TSH	83480
Hepatitis B S A_g	

Replacement Procedures

Colonoscopy v. Barium enema	74270, 74275
Upper endoscopy v. Upper G.I. series	74242
Gall Bladder sonogram v.	76120
Oral Cholecystogram	74290
Excision of colon lesion v.	44110
Colonoscopy with polypetomy	40206, 40226

---

[1]In addition to 100 high volume Medicare procedures

*Also available in USC-Mendenhall data.

Table 4

Procedures from USC-Mendenhall Data
(and Corresponding CRVS Codes)

Ob-Gyn

Cesarean Section (59560)
D & C (58120)
Vaginal Delivery (59410)

Internal Medicine, General Practice, Family Practice

Arthrocentesis (20610, 20605)
Chemotherapy (96030)
Lumbar Puncture (93200)
ECG (93000, 93010)

Surgery

Mastectomy (19160, 19180, 19240)
Cholecystectomy (47600, 47605)
Herniorrhaphy (49505)
Colon Resection (44140)
I & D (10000, 10010)
Proctosigmoidoscopy (45300)
Thoracentesis (32000)
Appendectomy (44950)

Pediatrics

Chemotherapy (96030)

III. CONSTRUCTING ALTERNATIVE RVSs

This section presents the approaches we propose to use in constructing alternative RVSs. It discusses each of the six major classes of methods -- charge based, time based, micro-costing, statistical cost functions, consensus development, and social preferences. In terms of implementation, the charge-based and time-based methods will be examined first. Statistical cost functions will be tested on an exploratory basis, since it is our belief that this approach is at best feasible for assigning relative values to only a few broad classes of procedures.

Our preliminary review of micro-costing methods has led us to conclude that this method cannot be implemented within the budget constraints of this project. Furthermore, we do not believe that this approach would be feasible or advisable even under less restrictive budget conditions. Accordingly, our research plan calls for a detailed and thorough review of micro-costing methods in order to provide evidence for our recommendation.

Implementation of the consensus development and social preference approaches will not begin until charge-based and time-based RVSs have been constructed. The reason for this phasing is that the charge-based and time-based RVSs may be useful inputs into both the consensus development and social preference methods. Planning and development of the implementation procedures for these two approaches will begin earlier, however.

A. CHARGE-BASED METHODS

Relative values will be computed by first selecting a point on the distribution of charges for each procedure as the measure of absolute value for that procedure, and then forming the ratio of each procedure's absolute value to that of the base, or numeraire procedure. We propose to select four

alternative points on each distribution: the mean, the median, the 75th percentile, and the 90th percentile.

Three additional variations in methods will be explored, one as a consequence of the data bases we will be using, the other two by design. The first variation involves the types of claims included in the distribution of charges for each procedure, i.e., Medicare only, Medicare and Medicaid, or all claims. The second variation would be to compute a single RVS which spans all procedure types. The approach currently used by most existing RVSs and procedure terminology systems is to compute separate RVSs for each of four procedure classes: medicine, surgery, pathology, and radiology. Consequently, each procedure class has its own numeraire and interclass comparisons of procedures' relative values are not possible. If approved by HCFA, we propose computing a single RVS which has only a single numeraire and encompasses all of the test procedures. A third type of variation we could consider is limiting the number of specialties in forming charge distributions. For example, proctosigmoidoscopies are performed with relatively high frequencies by general practitioners, general surgeons, and internists. Excluding any one or two of these specialties in forming the distribution of charges would undoubtedly alter its charge-based relative value.

Three data bases will be used to construct charge-based relative value scales: The Urban Institute's California Medicare/Medicaid Physician Claims File, the Health Insurance Association of America's Provider Charge Survey of Surgical Procedures, and HCFA's Medicare Prevailing Charge Survey. (See the Data Base Completion Report for complete descriptions of these data files.) These data sets differ in several interesting ways. First, the California Medicare/Medicaid file contains claims submitted by physicians in eleven different specialties. Second, the file permits us to use only Medicare

claims or Medicare and Medicaid claims together to form the charge distributions for each test procedure. Third, claims data are available for each of five years, 1974 through 1978. This allows a test of the stability over time of a charge-based RVS.

The HIAA data have two advantages. First, they are national in scope and, second, they are based on charges to commercial insurance companies. Although limited to surgical procedures, they permit us to assess whether an RVS based solely on charges to privately insured people differs substantially from one based on charges to Medicare and Medicaid beneficiaries.

The Medicare Prevailing Charge data also have several advantages. They are national in scope. They are routinely available on an annual basis. The 1982 version will include unindexed values of the 50th and 75th percentiles of charges. Lastly, they incorporate a wide variety of carrier discretion in terms of the types of claims (Medicare only, Medicare and Medicaid, or combined public and private) included in the underlying distributions. On the negative side, the Medicare Prevailing Charge data are limited to only 100 high volume Medicare procedures, not necessarily the 100 most costly. They also have limited specialty representation for most procedures. These limits could be relaxed in the future, however.

Although none of these data bases is ideal by itself, the different strengths of the three sets will enable us to analyze several important methodological questions. What are the consequences of using only Medicare claims? What is the impact of excluding claims of certain specialists? How does a single RVS for all procedures differ from one that retains procedure class distinctions? How stable is a charge-based RVS over time?

B. TIME-BASED METHODS

Time-based methods of constructing relative values are very similar to charge-based methods. We first form distributions of time per visit (rather

than charge per procedure) and select some point of the distribution to represent the absolute value of that procedure. As with the charge-based methods, we shall examine four alternative points: the mean, the median, and the 75th and 90th percentiles. Relative values are then computed by taking ratios of each procedure's absolute value to that of the numeraire or base procedure.

Many of the questions pertinent to an analysis of charge-based methods are pertinent to time-based methods as well. Should time distributions for some procedures be limited only to certain specialties? Should separate RVSs be constructed for different procedure classes? Should observation be limited to Medicare or Medicare/Medicaid visits only? How stable are time-based RVSs over time?

In addition, time-based methods face three other problems, two are generic and the third is unique to existing time data bases. The first is that time per visit may not be a very good indicator of a physician's experience relative to the complexity of the case being treated. For example, one might hypothesize that an experienced physician who specializes in complex cases can generally indicate his/her experience, training, and case complexity through fees charged both for visits and diagnostic/therapeutic procedures. This physician's time spent per patient may be less that that of a less experienced or less qualified physician treating the same patient, or no more than the time spent by a less experienced/qualified physician typically spends with a less complex patient mix. In order to reflect these differences, it is necessary to examine methods of constructing base values or adjustment factors which correct for differences in either physician training/experience or patient complexity.

The second problem concerns constructing relative values for procedures which are not performed exclusively by physicians. This would include most

lab procedures, many radiology procedures, and mnay types of injections. In a charge system, the costs or values of these procedures typically have a separate charge, whether performed by the physician or under his/her supervision. Physician time per visit, however, will not reflect the costs or values of these procedures unless the physician actually performs them. While this could be corrected prospectively, existing time data bases do not identify whether the physician personally performs the test indicated or simply has it done by someone else.

The third problem is that existing time data bases do not use any of the major procedure coding terminologies to identify procedures. This has two consequences for constructing relative value scales. The first is that various categories of visits can only be approximately associated with CPT-4 codes for visits (codes 90000 through 90441). The second is that there is little differentiation among types of specific lab, x-ray, and surgical procedures. For example, whether an x-ray was ordered will be indicated, but exactly what type of x-ray, who performed it, and how many were done are generally not available. Our approaches for dealing with these problems are discussed below after a brief description of the data sets we will work with. (See the Data Base Completion Report for more detail on the data bases.) Two data files are available for constructing time-based RVSs. One is the USC-Mendenhall survey of physician-patient encounters. It is a one time cross section survey conducted between 1974 and 1976. About 10,000 physicians participated in the survey and approximately 250,000 patient encounters were reported. Because of cost constraints, our analyses will be limited to about 5,000 physicians in six specialties: general practice, family practice, internal medicine, obstetrics-gynecology, pediatrics and general surgery. Although this data file has the limitations noted above, it

is far richer than the other available time-based data file, the National Ambulatory Medical Care Survey (NAMCS). Because of this richness, we will focus most of our analysis of time-based methods on the USC-Mendenhall data. NAMCS data, described below, will be used to examine the stability over time of time-based relative values for selected procedures.

Figure 1 is a copy of a sample encounter form and Figure 2 is a coding key used by 3 of the specialties we will be analyzing. As can be seen, data were collected for encounters in 9 possible locations, with separate identifiers for inpatient hospital, emergency room, and OPD/Clinic encounters. New and established patients can be distinguished. Patient age can be used to identify elderly Medicare beneficiaries. (Medicaid encounters cannot be identified.)

Of particular value to this project are the codes which indicate Encounter Class. The first classifiation, labelled Complexity, has five possible responses: minimal, brief, limited, extended, and comprehensive. These terms are also used in CPT-4 to describe various types of visits. USC-Mendenhall does not use the CPT-4 term "intermediate." Nevertheless, in conjunction with the Encounter Location, the "number of visits for this problem" counter, and new/established patient information, we plan to construct distributions of time per visit for encounters which are defined in terms similar to CPT-4 terms. Table 5 shows the high degree of similarity between the USC-Mendenhall visit codes and CPT-4.

Figure 1

PLEASE REVIEW INSTRUCTIONS BEFORE STARTING

ENCOUNTER LOCATION			
	1. Office	4. Hospital	7. Industry/School
	2. OPD	5. Emergency Room	8. Home
	3. Clinic	6. Extended Care (ICF, SNF, Nursing Home)	9. Other

PRIMARY PROBLEM TYPE		
	1. Preventive	5. Medical & Surgical
	2. Medical	6. Obstetrical
	3. Surgical - minor	7. Psycho/Social
	4. Surgical - major	8. Environmental/Economic

Tear off here

Staff may complete this section

Use numbers from Coding Key

PATIENT ID

Your Use Only	Line Number	ENCOUNTER DATE and TIME: Mo. Day Yr. Date; Time in Minutes	PATIENT & ENCOUNTER CHARACTERISTICS: Location (use one of the above codes 1-9)	Age: Estimate to nearest year "0" = under one year	Sex: 1. Male 2. Female	Seen patient before? 1. Yes 2. No	Regular patient? 1. Yes 2. No	Patient Source: 1. Self/Patient 2. Agency 3. Physician 4. Consult	Majority of Care: This patient? 1. Yes 2. No 3. Undetermined; Patient's family? 1. Yes 2. No 3. Undetermined	Your Role: 1. Provide 2. Assist	Number of visits for this problem?	Type (use one of the above codes 1-8)	PATIENT'S PROBLEM(S) Primary: Focus / Etiology (Dx)	Other: Focus / Etiology (Dx)	Other: Focus / Etiology (Dx)	DIAGNOSTIC PROCEDURES: Record all ordered, performed, or interpreted	THERAPEUTIC PROCEDURES: Record all ordered or performed	ENCOUNTER CLASS: Complexity / Severity / Urgency	STATU[S]: Your next contact / Referral Co[ntact]
	101	Primary Dx (Print)											Other Dx (Print)						
	102	Primary Dx (Print)											Other Dx (Print)						
	103	Primary Dx (Print)											Other Dx (Print)						
	104	Primary Dx (Print)											Other Dx (Print)						
	105	Primary Dx (Print)											Other Dx (Print)						

Figure 2

CODING KEY

FOCUS

1. Well patient

2. Skin, incl. nails and hair
3. Head/Neck

4. Eyes
5. Ears
6. Nose
7. Mouth/Throat

8. Breasts

9. Respiratory - upper
10. Respiratory - lower

11. Circulatory - heart
12. Circulatory - other
13. Blood/Lymphatics

14. Liver/Gallbladder
15. Gastrointestinal - other

16. Arthritis/Rheumatism
17. Muscular - other
18. Skeletal - other

19. Endocrine
20. Neurological
21. Emotional

22. Renal
23. Urinary - other
24. Genital - male
25. Gynecological

26. Obstetrical

27. Multi system*

*Use only if one of the above is not more descriptive and correct.

ETIOLOGY (DX)

1. None

2. Health assessment
3. Developmental
4. Pre/post surgical

5. Iatrogenic
6. Idiopathic (based on workup)

7. Infection/post-infection
8. Inflammation
9. Hemorrhaging/Bleeding
10. Occlusion
11. Ulceration

12. Immunologic
13. Allergic
14. Metabolic
15. Deficiencies
16. Nutrition, incl. weight

17. Congenital
18. Degeneration, incl. aging
19. Hypertension

20. Neoplasm - benign
21. Neoplasm - malignant
22. Neoplasm - undetermined

INTOXICATION/ADDICTION

23. Alcohol
24. Drug
25. Poison
26. Tobacco

TRAUMA

27. Burn
28. Concussion
29. Contusion
30. Dislocation/Fracture
31. Foreign body
32. Laceration
33. Sprain

PSYCHO/SOCIAL

34. General adjustment
35. Depression/Anxiety
36. Neuroses
37. Psychoses
38. Psychosomatic

UNDETERMINED

39. Cough
40. Fatigue
41. Fever
42. Headache
43. Malingering
44. Pain

DIAGNOSTIC PROCEDURES

1. None

2. Routine lab: CBC, Urinalysis
3. Serology/VD
4. Blood chemistry
5. "Panel" - automated (e.g., SMA-12)

6. ECG
7. Culture
8. Enzymes

9. Biopsy
10. Bone marrow
11. Endoscopy

RADIOLOGY

12. Chest
13. GI
14. Fluoroscopy
15. Isotopes
16. X-ray - other

OTHER

17. Catheterization
18. EEG
19. Thermography

20. Glucose tolerance
21. Lipid screen
22. Liver function
23. Lumbar puncture
24. Pulmonary function
25. Renal function
26. Thyroid function

27. Breast exam
28. Pap smear
29. Skin test - allergy
30. Skin test - TB/Mycosis

31. Audiometry
32. Tonometry
33. Developmental screen

34. Tests - other

THERAPEUTIC PROCEDURES

1. None

2. Immunizations
3. Injections - other

DISLOCATIONS/FRACTURES

4. Reduction - open
5. Reduction - closed

SURGICAL

6. Minor tissue removal
7. Incision/Drainage
8. Suturing only
9. Debridement
10. Organ removal/repair
11. Foreign body removal
12. Dilation/Curettage

13. Arthrocentesis
14. Paracentesis

15. Catheterization
16. Cauterization/Cryotherapy
17. Surgery - other

POST-SURGERY/INJURY

18. Cast/Splint: apply/remove
19. Dressing: apply/remove
20. Suture removal

OTHER RX

21. Anesthetization
22. Chemotherapy
23. Contraceptives, incl. IUD
24. Physical rehabilitation
25. Radiation therapy
26. Transfusion
27. Rx - other

COUNSELING

28. Growth/Development
29. Family/Social/Sexual
30. Patient education
31. Therapeutic listening
32. Treatment program

PRESCRIPTIONS/ORDERS

33. Drugs - systemic
34. Drugs - topical
35. Exercise/Diet
36. Prosthesis/Aids

ENCOUNTER CLASSIFICATION

COMPLEXITY

1. Minimal
2. Brief
3. Limited
4. Extended
5. Comprehensive

SEVERITY

1. None
2. Minor - acute
3. Minor - chronic
4. Moderate - acute
5. Moderate - chronic
6. Severe - acute
7. Severe - chronic

URGENCY

1. None
2. Could have been deferred
3. Needed to see today
4. Should have seen sooner
5. Emergency

STATUS/DISPOSITION

YOUR NEXT CONTACT

1. None this problem
2. Telephone

OUTPATIENT

3. Return as necessary
4. Visit scheduled
5. House call

INPATIENT

6. At hospital admission
7. On rounds (prior admission)
8. In surgery

OTHER

9. Emergency room
10. Extended care (ICF, SNF, Nursing Home)
11. DOA/Death
12. Other

REFERRAL/CONSULTATION

1. None
2. Return to referral source
3. Medical specialist for care
4. Medical specialist for consult
5. Surgical specialist for care
6. Surgical specialist for consult
7. Dentist
8. Physician Extender (e.g., Medex, Nurse Practitioner, Physician's Assistant)
9. Therapist/technician (e.g., Dietary)
10. Public agency
11. Other

Table 5

CPT-4 Visit Codes and Corresponding USC-Mendenhall Visit Codes

Description	CPT-4	USC-Mendenhall		
		Encounter Location Code[3]	Visit Counter[4]	Complexity Code[5]
New Patient, Office Visits[1]				
Brief Evaluation	90000	1-3,5	any	2
Initial Limited	90010	1-3,5	1	3
Initial Intermediate	90015	1-3,5	1	?
Initial Comprehensive	90020	1-3,5	1	5
Established Patient, Office Visits[2]				
Minimal	90030	1-3,5	any	1
Brief	90040	1-3,5	any	2
Limited	90050	1-3,5	any	3
Intermediate	90060	1-3,5	any	?
Extended re-exam	90070	1-3,5	2+	4
Comprehensive re-exam	90080	1-3,5	2+	5
Established Patient, Home Visit[2]				
Brief	90140	8	any	2
Limited	90150	8	any	3
Intermediate	90160	8	any	?
Hospital Visits				
Initial, Brief or Limited	90200	4	1	2,3
Initial, Intermediate	90215	4	1	?
Initial, Comprehensive	90220	4	1	5
Brief Follow-up	90240	4	2+	2
Limited Follow-up	90250	4	2+	3
Intermediate Follow-up	90260	4	2+	?
Extended Follow-up	90270	4	2+	4

Notes:
1. "Seen patient before?" = 2 on Figure 1
2. "Seen patient before?" = 1 on Figure 1
3. See ENCOUNTER LOCATION box on Figure 1.
4. See "Number of visits this problem?" on Figure 1.
5. See ENCOUNTER CLASS on Figure 1 and ENCOUNTER CLASSIFICATION - COMPLEXITY on Figure 2.

The Severity codes (SEE ENCOUNTER CLASS, Figures 1 and 2) along with data on physicians' characteristics (board certification, experience (measured by years since medical degree received), country of medical education, and medical school faculty appointment) will be used to tackle the problem of constructing a method which takes account of differences in physicians' qualifications and patient case mix. The problem is twofold. Holding the severity of the case constant, what adjustments need to be made to relative values so as not to penalize efficient physicians or reward inefficient physicians? Holding the physician's qualifications constant, how can relative values be adjusted so as not to penalize physicians who take on difficult cases?

The method we propose to examine is based on the premise that if these factors are important, they will have statistically significant coefficients in a regression model which has time per visit as the dependent variable and other potentially important factors as control variables. Furthermore, the regression coefficients can be used to construct multipliers which adjust relative values to account for experience and severity differences across physicians and patients. For example, let t_i represent reported time per visit for one of the visit codes listed in Table 5, X be a vector of physician characteristics, and S1, S2, S3 and S4 represent the four severity codes, none, minor, moderate, and severe, respectively. We would then estimte the following regression

(1) $$t_i = a + bX + c_2S2 + c_3S3 + c_4S4.$$

(S1 is the omitted reference category for severity.)

Suppose that c_2, c_3, and c_4 are statistically significant, i.e., patient severity does have a meaningful impact on time per visit. These coefficients can now be used to construct multipliers to adjust relative values as follows. First, set c_2, c_3, and c_4 equal to zero and use the a and b coefficients of equation (1) to construct a distribution of time per visit for i

procedures adjusted for physicians' characteristics. Relative values among the i procedrues can be computed in the usual way. The resulting RVS_1 would be adjusted for differences in physicians' characteristics and would be based on non-severe cases. The severity coefficients, c_2, c_3, and c_4, indicate how many additional minutes are required relative to a nonsevere case. Thus, for minor severity, for example, c_2 would be added to the underlying absolute value of each procedure code and a new relative value scale, RVS_2, would be formed. (Note that c_2 would vary from procedure to procedure i.e., there is a separate regression for each procedure.) The ratio of RVS_2 to RVS_1 for each procedure would be the multiplier applied to the base RVS to distinguish cases of minor severity from nonsevere cases. Similar multipliers could be formed for the other two severity codes.

Adjustments for significant differences in physicians' characteristics could be carried out in the same way. Suppose, for example, that board-certified internists require (statistically) significantly less time than other physicians to conduct certain visits, holding severity constant. In other words, the board-certified internist would be the efficient provider. Thus, HCFA may want to base its relative value scale on the time required by an efficient provider to perform a service. If, on the other hand, physicians' characteristics are not statistically significant in the regression model, then there would be little justification for modifying relative values on this basis.

The other problems noted above were the lack of CPT-4 procedure codes and the difficulty of assigning relative values to procedures that the physician does not exclusively perform or that have large capital or equipment costs. Table 4 listed a number of CPT-4 procedure codes and approximately equivalent USC-Mendenhall procedures based on codes for Focus, Etiology, Diagnostic

Procedures, and Therapeutic Procedures. (See Figure 2.) These procedures were selected because they represent a range of delegability and non-physician costs. We will construct time-based RVSs for these procedures for the purpose of comparing them with charge-based RVSs. On theoretical grounds, the latter are more likely to reflect both the degree of delegability and non-physician costs.

The second data file we will examine is the National Ambulatory Medical Care Survey. It is more limited than the USC-Mendenhall data in several respects. First, the sample is only about one-fifth as large, about 2,000 physicians and 50,000 patient records. Second, encounters are limited to those which occur in the office. Third, as shown in Figure 3, a copy of the NAMCS patient record and log, much less information is available on the nature of the visit. NAMCS's major advantage is that it is an annual survey. Thus, for procedures that are reasonably similar to identifiable procedures on the USC-Mendenhall data, we propose constructing RVSs at two points in time, 1980 and 1975, to determine whether the RVSs change very much over time. This check will indicate whether frequent updating would be required for a time-based RVS.

C. MICRO-COSTING

Implementation of micro-costing methods for constructing relative value scales is not feasible within this project's budget. Furthermore, based on our preliminary analysis, we do not believe that micro-costing has very much promise as a method for constructing RVSs. It is an extremely expensive technique because it requires extensive on-site observation. The results are sensitive to both the sites chosen and measurement techniques used. Replication is difficult. Statistical reliability is also low, since the method cannot be applied to a large number of sites at reasonable cost. The method

is likely to be highly obtrusive in the medical practice. Finally, the strength of micro-costing methods is primarily in services that vary widely in equipment and capital requirements. However, existing CPT-4 terminology is generally not equipment-specific.

We propose, therefore, to better document these conclusions by first preparing a more detailed summary and review of prior micro-costing studies and then evaluating these studies in terms of the requirements of a method for constructing an RVS. The emphasis in this review will be placed on the cost of implementation, the arbitrariness of many of the assumptions that need to be made, problems of replicability and generalizability, and the difficulty of assessing statistical reliability. Our review will also include a description and assessment of the work-load measurement method used by the College of American Pathologists to assign work-load units to different types of lab equipment. As noted in our preliminary analysis, however, this is only partial micro-costing because only non-physician personnel costs are measured. Physician costs, equipment costs, and facility (overhead) costs are not included in the CAP method. This review and assessment of micro-costing will be included in our report at the end of the project's first year.

D. STATISTICAL COST FUNCTIONS

The estimation of statistical costs functions as a method of assigning relative values faces several major problems.* An ideal data set would provide detailed information on physicians' outputs, using CPT-4 (or CRVS) codes to identify outputs, and on the prices they pay for their inputs. Such a data set does not exist. Even if it did, however, very little is known about the

---

* See "Preliminary Research Plan", U.I. Working Paper No. 3075-1, November 1981, pp. 25-7.

statistical reliability and robustness of multi-product cost functions for physicans' practices. In addition, the sensitivity of the estimates to simultaneous equation estimation (because the outputs are endogenous) and the method of imputing the physician's implicit wage is not well known.

Accordingly, we propose exploratory estimation of multiproduct, trans-log cost functions using data from HCFA's physician survey. Although this data set is far from ideal, it does contain information on several outputs: office visits, house calls, inpatient hospital visits, ER and OPD visits, nursing home visits, operations, and crude indicators of the numbers of x-rays, lab tests, injections or immunizations, and office surgeries performed. The survey does contain excellent information on input prices. Physicians' incomes, however, are reported only in $10,000 intervals.

The parameters of the cost function will be estimated by applying the seemingly unrelated regression analysis technique to the cost function and n-l share equations, S_j, where S_j is the share of total costs spent on the jth input (GAO, 1980, pp. 34-5). This system is represented by equations (1) and (2). (Lower case c, y, and p represent natural logs.)

$$c = a_o + \sum_i a_i y_i + \sum_i b_j p_j + \frac{1}{2}\sum_i\sum_l d_{il} y_i y_l + \frac{1}{2}\sum_j\sum_k g_{jk} p_j p_k + \sum_i\sum_j r_{ij} y_i p_j,$$

$$S_j = b_j + \sum_k g_{jk} p_k + \sum_i r_{ij} y_i, \qquad j = 1, \ldots n-1,$$

Where

c = total cost

y_i = outputs $\quad i,l = 1, \ldots, n,$

p_j = input prices $\quad j,k = 1, \ldots, m,$ and

$S_j = P_j X_j / C$ = share of X_j in total costs.

Using the HCFA data, we shall explore the following econometric issues. How sensitive are the parameter estimates to the numbers of outputs and input prices specified? What are the consequences of not treating the outputs as endogenous? Are the results sensitive to the method of imputing the physicians' implicit wage? Are the results plausible, i.e., all outputs should have positive marginal costs, and do marginal costs bear any systematic relationship to average prices charged? (Under competitive conditions, they should be approximately equal. If markets are not competitive, then prices should be greater than marginal costs.) How sensitive are the results to the mix of specialties used in the estimation? Until more is known about these issues, it would not be advisable to engage in the large data collection effort which would be needed for full implementation of the statistical cost function approach.

E. CONSENSUS DEVELOPMENT (DELPHI)

The consensus development approach (and the social preferences approach discussed below) differ from the previous methods described in a very important way. They are extremely general processes what are not tied either to a particular type of data or a particular analytic technique. As such, how one applies or structures a consensus development approach depends on what one wants to do. Consequently, we propose to analyze both the consensus development and social preference approaches in two phases. The first will concentrate on identifying the various steps involved in applying the approach, the choices which must be made at each step, and the potential problems and consequences associated with various choices. Descriptions and analyses of previous applications of these approaches to other problems will be an important part of this phase.

The second phase of our analysis would consist of partial implementation and testing of one or more aspects of each approach.* The essence of the consensus development approach we propose to examine is the use of a panel of experts whose pooled judgments represent a "best guess" about how procedures should relate to one another. Expert panels can meet face-to-face or respond through mail instruments. They can face highly structured rules for interaction or can operate as a committee, where rules of order are determined as part of the group's agenda.

The best known consensus approach is the Delphi method (Dalkey, 1968). In contrast to simple questionnaires administered to a group of respondents, Delphi involves three to four successive rounds of anonymous questionnaires with feed-back of information to respondents between rounds. In the first round, for example, individuals might be asked to assign relative values to a sample of procedures with only very general instructions. The median rating could then be returned to the respondents along with additional information, e.g., charge-based relative values, with a request to perform a second rating. More elaborate Delphi questionnaires may ask respondents to list the considerations underlying their rating, and these qualitative judgments may be fed back to all respondents in successive rounds. Experiments with the Delphi technique have shown that convergence to a "consensus" is common over three to four rounds of questionnaires, where consensus is defined as an acceptably low level of variation in estimates around the mean or median (Dalkey, 1968).

---

* Large scale testing is probably not possible for two reasons: The likely need for OMB clearance for tests involving more than nine individuals, and political reactions from interested parties with significant financial stakes in the outcome of the test.

Whether Delphi performs better than face-to-face groups is subject to conflicting evidence. Campbell (1968) found Delphi groups to be more accurate at short-term economic forecasts than face-to-face encounters, but Farquhar (1970) found significantly better results in face-to-face groups required to solve a complex estimation task. However, neither of these studies compared the impact of group size on the accuracy or quality of the outcome of either kind of group. Because Delphi allows for participation of more experts than do face-to-face groups, which have a practical limit of about 15 (Filley, 1970), it may in reality be a more accurate technique. The anonymity of the Delphi process may be another advantage compared to face-to-face meetings, since it lessens interspecialty conflicts over medical "turf" and financial stakes.

Several pertinent questions arise in considering the application of Delphi approaches to the construction of relative value scales. To be theoretically sound, the designers must know and be able to communicate to respondents the basis for construction of the RVS. The conceptual problem of determining just what an RVS should represent (i.e., resource costs, relative prices, efficient prices, or social preferences) are not bypassed in this method. Vague instructions are likely to induce unstable and unconfident responses (Scheibe, Skutsch and Schofer, 1975). It is inappropriate to use such techniques to determine simultaneously the appropriate conceptual basis for an RVS and the RVS itself.

Another important issue is the definition of an expert. This is no trivial question in any Delphi application; much has been written on the pitfalls of panel selection (Dalkey, 1969; Bedford, 1972). In the case of the RVS application, there is an uncomfortable coincidence of expertise in the delivery of the service and financial stake in the outcome of the Delphi

exercise. Such a situation invites the "social abuse" of Delphi, a danger first articualted by Sackman (Sackman, 1974). Even absent this conflict of interest, the composition of the panel is likely to affect the outcome. How does one balance the experience of specialists and general practitioners, teaching and non-teaching physicians, those in group and solo practice? Moreover, to what extent should disinterested but knowledgeable parties such as financial analysts be involved in the Delphi exercise? Which interest groups need to be included in the process in order to assure political acceptability?

A third issue, related to the second, is whether the goal of the exercise is to achieve point estimates or to represent the probability distribution of opinions about relative values. Consensus can be forced (Dalkey, Brown, and Coochran, 1970), obscuring the true distribution of values.

A final question is whether a Delphi technique can produce valid interval scales. Experimental research has demonstrated that ordinal scales (rank-orders) produced in Delphi are accurate and stable, but the approach is more questionable when judgments about the degree of difference (interval scale) is required (Scheibe, Skutsch, and Schofer, 1975).

The first phase of our analysis will examine alternative approaches to dealing with these and other questions which arise in the design of a Delphi method. These questions can be summarized as follows:

- o How are experts defined and identified?
- o What interest groups, if any, should participate?
- o What instructions, especially the concepts or factors to be considered in assigning relative values, should be given to the panel?
- o What specific additional information should be provided?
- o In what form should feedback be provided, e.g., mean, median, variance, max and min values?

- o How many rounds should be used?
- o What procedures should be included?
- o Should the process try to identify the reasons for assigment?
- o Should participants be compensated?
- o How is consensus or convergence identified?

Based on answers to these questions, we will develop a sample set of instruments which could be used to test the method. Comments on the instruments and reactions to the process will be obtained from informal consultations with a small number of experts and interest group representatives.

F. SOCIAL PREFERENCE FUNCTIONS

Our analysis of the social preference function method will focus on the following questions. First, can social preferences be identified? Second, to which types of procedures should social preferences be applied, i.e., which relative values constructed by other methods (charge-based, cost-based, time-based, CRVS, etc.) diverge from the "socially preferred." Third, how can social preferences be used to adjust or correct relative values?

The first question will be addressed primarily by means of a review of reports, statements, and documents issued by organizations which purportedly represent various aspects of social preferences. These would include federal legislation, studies mandated by the Congress, reports of Presidential commissions and special task forces--such as the Study of Surgical Services in the United States (SOSSUS), the Graduate Medical Education National Advisory Committee (GMENAC), the AMA's National Commission on the Cost of Medical Care, and the AAMC's Task Force on Graduate Medical Education--statements and positions of specialty societies and insurer organizations, and statements of groups which represent consumers or patients, e.g., the National Health Law Program, the American Association of Retired People, and the Women and Health Program.

The goal of this review would be to identify the extent of consensus with regard to changes in the mix and distribution of physicians and physicians' services. For example, many people feel that there are too many operations, not enough primary care services, too many radiological and laboratory procedures, not enough patient-physician contacts, too many deliveries by cesarean section, and too few physicians in rural and inner-city areas. Although imprecise, these types of statements do represent social preferences to some extent.

This review will be part of the year 1 report. The next step would be to apply or compare these preferences to one or more RVSs to assess whether the relative values of selected procedures deviate from the expressions of social preference. We would use a panel of expert consultants (drawn form providers, insurers, government, and consumer/patient groups) to make these assessments. The information provided to the panel would be a summary of the social preference statements and one or more relative value scales. The panel's charge would be to determine whether the relative values are consistent with social preferences. For those which are not consistent we would then address the question of the extent of divergence, i.e., how much out of line are they.

How relative values are adjusted to correct deviations from social preferences is the third question. Possible areas we might explore are Blue Shield Plans' and commercial insurers' committees which have the explicit charge of setting or adjusting relative values, the California Medicaid program, which implemented a de facto social preference approach when it implemented a uniform, statewide Medicaid fee schedule in 1976, and the government run health plans in Quebec, Canada and West Germany. The former sets fees so as to equalize rates of return to training in various specialties. The latter has tried to use relative fee adjustments to control expenditures.

IV. STATISTICAL ANALYSIS OF ALTERNATIVE RVSs

Once two or more RVSs have been constructed, a natural question which arises is how different are they? This section describes some simple statistics and statistical tests which we will perform in order to provide relatively concise measures of the degree of similarity or difference among methods. These comparisons will focus primarily on variations within a class of methods and, to the extent possible, on differences across methods. The reason for conducting these types of tests is that if two or methods are substantially similar, for example, RVSs based on the mean and median points of charge or time distributions, then the number of RVSs that need to be considered in the simulation phase of the analysis could be reduced.

The first question which arises is whether the ordinal ranking of procedures is similar across RVSs. This can be easily determined by computing rank-order correlation coefficients. For those which are similar in terms of rankings, the next question is whether the intervals between procedures are similar. This can be assessed by computing a simple pearson correlation coefficient. Finally, what is the overall dispersion of relative values in the scales? Simple means, variances, and selected percentiles of the relative values in each scale will provide this information.

In all likelihood there will be few, if any pairs of RVSs which are either identical or completely uncorrelated. Given that there are differences, it would be useful to identify the sources of differences. Do some RVSs systematically over- or undervalue some types of procedures? How do the different methods value certain key procedures--very expensive procedures, new procedures, rarely done procedures, technologically dynamic procedures, etc.? We will examine these questions by computing for each procedure its average, minimum, and maximum ranking across the different RVSs. Examining

procedures which are ranked very high in some RVSs and very low in others will help in assessing the overall characteristics of the different scales. Similarly, examining both the rankings and relative values of the key procedures will help in assessing alternative methods' strengths and weaknesses.

V. SIMULATIONS AND POLICY ANALYSIS

The project's second year will consist primarily of a policy analysis of the methods which appear most promising on the basis of the Phase I preliminary evaluations. The cornerstone of the policy analysis will be the simulation of the redistributive and cost implications of each method. While the choice of the appropriate data set will depend on the results of Phase I, the most likely candidate will be The Urban Institue's California Physicians' Medicare and Medicaid Claims File.

As described in detail in the Data Base Completion Report, the California Physician File contains all claims submittede by approximately 7,500 physicians during the first calendar quarter of each year from 1974 through 1978. The simulations will be based on data from the 1978 file. The reference point for the simulations will be the amount and distribution of money actually spent by Medicare and Medicaid for reimbursements to the physicians in our file. Thus, the initial distribution of payments and initial total cost will be based on Medicare's and Medicaid's actual payments to physicians grouped by specialty, type of practice (solo or group), age of license (a special subsample of all physicians who obtained licenses between 1973 and 1978 is part of our file), practice location (large SMSA, small SMSA, non SMSA), and country of medical education (foreign or domestic). Separate distributions and totals will be computed for Medicare and Medicaid.

The simulations will consist of computing how Medicare's and Medicaid's

payments would have changed under the assumptions of a constant price per relative value unit, but a different structure of relative values associated with each procedure. The total cost to Medicare and Medicaid can be held constant by picking the conversion factor--the price per relative value unit--such that total costs remain the same. Under these circumstances, the primary impact of an alternative relative value scale will be to alter the distribution of payments among physicians. For each group of physicians identified above, we will report the percentage change in Medicare and Medicaid payments (under the constraint that total changes in payments sum to zero, i.e., total program costs remain constant).

One relative value scale which will surely be included in these simulations is the California Relative Value Studies (1974 edition). A step-by-step description of how its implications for the Medicare program will be simulated should clarify how this task will be conducted.

- Each procedure is assigned its CRVS value. (This already exists on the file.)

- For each physician, the total number of CRVS units is computed by multiplying, for each procedure, the number of services provided to Medicare beneficiaries by its CRVS value. This will be done separately for each procedure type (medical, surgical, laboratory, and radiology).

- The total number of CRVS units will be computed for each major procedure type by summing over all physicians in the file.

- Total Medicare payments will be divided by total CRVS units for each procedure type to produce the four conversion factors which hold program payments constant.

- The conversion factors, which are measured in dollars per CRVS unit, are next applied to each physician's output of CRVS units to simulate how much each physician would have received if procedures' relative prices were identical to CRVS values.

- Distributional consequences are determined by summing total payments based on CRVS relative values for each of the groups of physicians identifed above, and comparing these totals with actual Medicare payments.

Identical procedures would be followed to estimate the impact of converting Medicaid (Medi-Cal) to the same set of relative values. The implications of alternative relative value scales will be assessed by altering the values which are assigned in the first step of the simulation.

In order to be politically acceptable to physicians, it is probable that one condition an RVS would have to meet is that no group of physicians be made worse off (in terms of income) relative to the existing system. This, of course, implies that program costs would increase. In effect, the higher program costs, at least in the short run, would have to be considered part of the cost of implementing the RVS system. (This seems to have been the case in Canada, for example, where all physicians' incomes went up immediately following the conversion to fee schedules (Hadley et al., 1979).) Thus, the second major output of the simulations will be to compute the change in the values of the conversion factors (for medical, surgical, laboratory, and radiology procedures) which would meet the condition of political acceptability to physicians.

These simulation outputs will be summarized by a series of tables showing the changes in the distribution of payments for each of the groupings of physicians, the increase in program costs required to at least maintain all physicians' current payment levels, and the values of the conversion factors for each procedure type. Table 6 illustrates what the table for the impact on different specialties might look like. Similar tables would be produced for other distributional groupings.

A key assumption underlying this first set of simulations is that the number of times a procedure is performed is not influenced by the relative value scale. In other words, the aggregate (and individual) physicians' supply functions are assumed to be vertical, i.e., independent of price.

Table 6

Impact of Alternative RVS on Payments
by Specialty-Medicare
(California, 1978)

Specialty	Current Distribution	CRVS	RVS #2	RVS #3	...	RVS #n
	Percentage Distribution of Payments					
General & Family Practice						
Internal Medicine						
etc.						
All Specialties	100%	100%	100%	100%	...	100%
Conversion Factors - $s per RVU						
(No Change in Program Costs)						
Medical Procedures						
Surgical Procedures						
Laboratory Procedrues						
Radiological Procedures						
Conversion Factors - $s per RVU						
(No Decreases in Payments to Physicians						
Medical Procedures						
Surgical Procedrues						
Laboratory Procedures						
Radiological Procedures						
Total Cost Increase - $					...	

Previous research done at the Urban Institute and elsewhere suggests that this is not the case. First, it is reasonably well-known that the number of physicians treating Medicaid and Medicare patients goes up as Medicare and Medicaid unit prices increase relative to billed charges. Second, it also appears that the Medicaid and Medicare patient loads per physician also increase (Hadley, 1979; Paringer,. 1980). Finally, although procedure-specific supply functions have not been estimated, it seems probable that the provision of at least some procedures, presumably those that have close medical substitutes or are of marginal therapeutic value, are sensitive to the payment received.

Under these circumstances, it seems that the results of the constant quantity simulations should be subject to a "sensitivity" analysis based on alternative assumptions about the elasticities of the implicit procedure-specific supply functions. (These assumptions could be made arbitrarily, built from best-guess estimates from prior research, or based on the direct estimation of simple supply functions using the California physician data). At this time, however, this second set of simulations is proposed only as an option to be considered by HCFA, rather than a definite component of the proposed analysis plan.

REFERENCES

Bedford, Michael T. "The Value of Competing Panels of Experts and the Impact of 'Drop-outs' on Delphi Results," Delphi: The Bell Canada Experience, Bell Canada, October 1972.

California Medical Association. 1974 Revision of the 1969 California Relative Value Studies. Fifth Edition (revised). Adopted by the CMA Council November 8, 1974.

Campbell, R. M. "The Delphi Technique: Implementation in the Corporate Environment," Management Services 5 November-December 1968. 37-42.

Dalkey, N. C. Experiments in Group Prediction. The Rand Corporation, P-3820, March 1968.

Dalkey, N. C. The Delphi Method: An Experimental Study of Group Opinion. The Rand Corporation, RM-5888-PR, June 1969.

Dalkey, N. C., and Brown, B. Comparison of Group Judgment Techniques with Short-Range Predictions and Alamanac Questions. The Rand Corporation, R-678-ARPA, May 1971.

Dalkey, N. C., Brown, B., and Cochran, S. The Delphi Method IV: Effect of Percentile Feedback and Feed-in of Relevant Facts. The Rand Corporation, RM-6118-PR, 1970.

Dalkey, N. C., and Rourke, D. L. Experimental Assessment of Delphi Procedures with Group Value Judgments. The Rand Corporation, R-612-ARPA, February 1971.

Farquhar, J. A. A Preliminary Inquiry into the Software Estimation Process. The Rand Corporation, RM-6271-PR, August 1970.

Filley, A. C. "Committee Management: Guidelines from Social Science Research," California Management Review 13(1) Fall 1970: 13-21.

Hadley, Jack. "Physician Participation in Medicaid: Evidence from California," Health Services Research 14 Winter 1979: 266-80.

Hadley, Jack, et al. "Can Fee-For-Service Reimbursement Coexist with Demand Creation?" Inquiry Fall 1979: 247-58.

Paringer, Lynn. "Medicare Assignment Rates of Physicians: Their Responses to Changes in Reimbursement Policy," Health Care Financing Review Winter 1980: 75-90.

Sackman, H. Delphi Assessment: Expert Opinion, Forecasting, and Group Process. The Rand Corporation, R-1283-PR, April 1974.

Sheibe, M., Skutsch, M., and Schofer, J. "Experiments in Delphi Methodology," The Delphi Method: Techniques and Applications. Reading, Mass.: Addison-Wesley Publishing Company, 1975.

U. S. General Accounting Office, "Health Maintenance Organizations Can Help Control Health Care Costs," GAPO Report No. PAD-80-17, May 6, 1980.